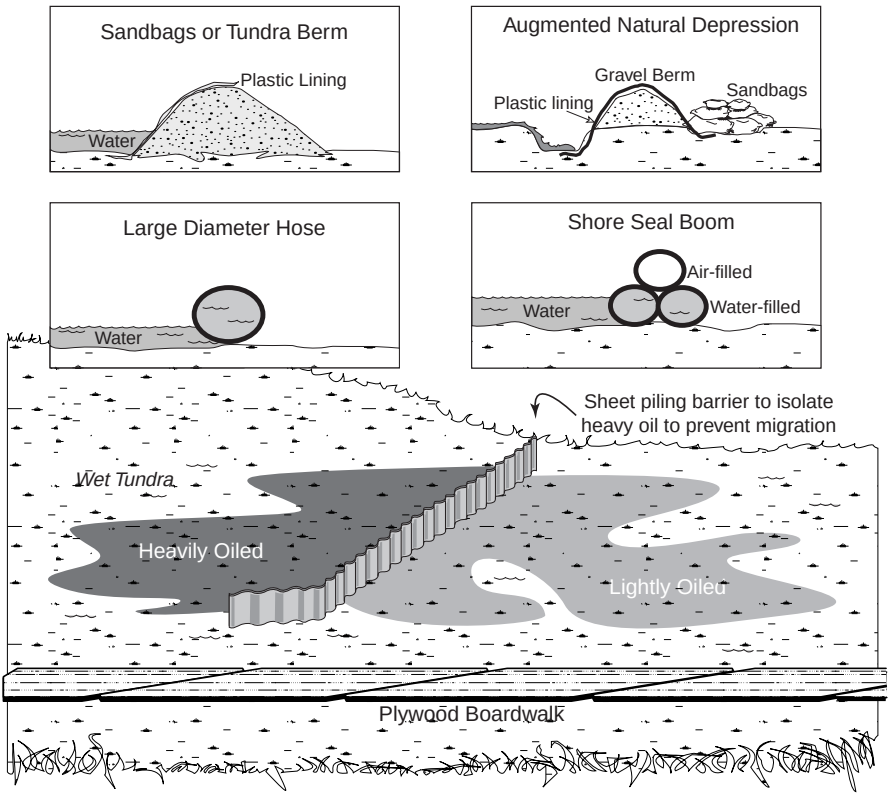

Land barriers can be used for the following purposes:

- Contain and stabilize a contaminated area.
- Contain flood waters (Tactic T-1).
- Divert flush waters to a collection area and retain for recovery (Tactic T-2).
- Block water from migrating onto a site during draining (Tactic T-14).
- Augment a natural depression or a trench (Tactic T-9) to act as a containment area for recovery.

The type of barrier chosen depends on the site topography, tundra type, and treatment strategies. When flooding an area, contain it completely so that the water level may be elevated above the ground surface and the floating residue recovered. When using a barrier to prevent contaminant migration, form the barrier materials into a horseshoe shape downgradient of the flow. When capturing flush water for recovery, use barrier materials to augment a natural depression or a trench and direct flush waters in that direction.

Land barriers can be built with the following materials:

- Sand bags
- Shore Seal boom
- Large-diameter water-filled hose
- Sheet piling
- Tundra berms
- Gravel berms

APPLICABILITY

	APPLICABILITY	COMMENTS
SPILLED SUBSTANCE	All	• Water-soluble substances will tend to migrate vertically as well as horizontally in all tundra types. Subsurface barriers (such as sheet piling) may be appropriate to prevent subsurface migration of water-soluble spilled substances. • Non-water-soluble substances will tend to migrate horizontally (float) on wet and moist tundra, but will penetrate vertically into dry tundra.
TUNDRA TYPE	All	• Subsurface (vertical) migration of spill substances is more likely in dry tundra than other tundra types. • Subsurface pore spaces in moist and wet tundra are saturated with water and these tundra types, therefore, are relatively protected from vertical migration of non-water-soluble substances. Non-intrusive land barriers (e.g., sandbags, Shore Seal boom) are appropriate.
SEASON	All	• Shore Seal boom is particularly effective if frozen in place.

CONSIDERATIONS AND LIMITATIONS

- Use of vehicles on tundra must comply with applicable tundra travel policies (Tactic P-5).
- Land barrier techniques are appropriate for use on sites with low flow and shallow water.
- Disposal of construction material should be taken into account.
- Tundra (earthen) or gravel berms are the least desirable option for land barriers.
- Any digging should be a last resort and should be confined to as small an area as possible.
- All land barrier techniques described in this tactic (except sheet piling) have been adapted from Tactic C-4 in the *Alaska Clean Seas Technical Manual* (Alaska Clean Seas, 1999, Vol. 1). Sheet piling has been used with success on wet or moist tundra on the North Slope to prevent subsurface migration of contaminants (Cater and Jorgenson, 1995).

EQUIPMENT, MATERIALS, AND PERSONNEL

- Appropriate boom material (2 to 5 workers, depending on site) – to construct land barrier
- Backhoe (1 operator) – to build gravel or tundra berm
- Front-end loader with bucket (1 operator) – to move gravel or sand bags
- Floating pump and blower (2 operators) – to fill Shore Seal boom with air/water
- Visqueen or similar heavy plastic sheeting – to line gravel or tundra berms
- Sledge hammer – sheet piling installation